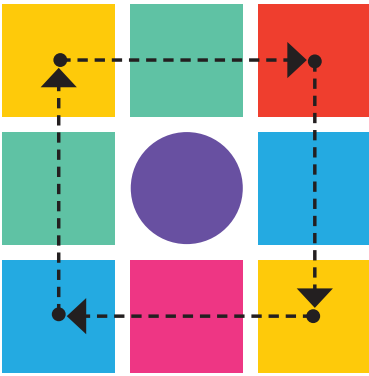


How Blockchain is Poised to Revolutionize Digital Customer Experiences



Blockchain technology, which came to prominence with the success of the cryptocurrency Bitcoin, has the potential to transform the way companies interact with their customers. Blockchain is a platform for decentralized computing that enables anyone to exchange value with another party without relying on a central authority to transact securely.¹ This means individuals or organizations can conduct their activities without an intermediary.

Today, senior executives in nearly every economic sector are looking to harness blockchain's power to create new value for customers. For example, through the Food Trust blockchain group, Walmart is collaborating with major players in the food, consumer goods and retail industry—including Dole Foods, Kroger, Tyson Foods, and Unilever—to create a system designed to be “the equivalent of FedEx tracking for food,” says Frank Yiannas, Walmart vice president for food safety.² Why do this? Because now it can take too long to trace contaminated food in the supply chain—for instance, between 18 hours and six days to trace a shipment of mango slices from a Mexican orchard to a Walmart store in Arkansas—using paper and existing IT systems that rely on barcode scanners.

In a demo, the blockchain system did it in 2.2 seconds.

¹ BigChainDB, “Blockchain Infrastructure Landscape: A First Principles Framing,” July 15, 2017, accessed at <https://blog.bigchaindb.com/blockchain-infrastructure-landscape-a-first-principles-framing-92cc5549bafe>.

² Wall Street Journal, “Walmart-Led Blockchain Effort Seeks Farm-to-Grocery Aisle View of Food Supply Chain,” June 25, 2018, accessed at: <https://blogs.wsj.com/cio/2018/06/25/walmart-led-blockchain-effort-seeks-farm-to-grocery-aisle-view-of-food-supply-chain>.

Rather than having to wait days to address an outbreak of a food-borne illness or some other quality control issue that affects customers, Walmart could respond almost instantly, avoiding reputational damage and, more importantly, guarding the public's health.

As this example illustrates, blockchain can help companies become better at what they already do by reducing their costs (thereby delivering savings that can be passed on to the customer in the form of better-value products and services) and by reducing the sources of friction that can degrade the customer relationship. We think of this as a "Curve 1" blockchain opportunity, one that makes a marketplace of buyers, sellers and the parties in between them more efficient.

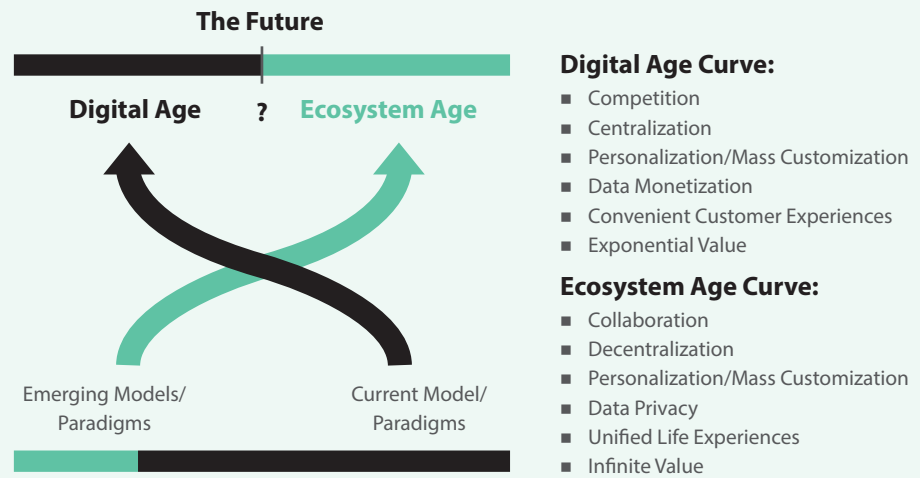
But blockchain's impact is likely to be far greater. At its most advanced, the technology can help companies transform the life experiences of their customers. They can do this by collaborating in decentralized networks that include other companies, individuals, governments and non-governmental organizations (NGOs) to create more personalized "life experiences"—everything from birthday parties, "green" vacations, new homes and new jobs, to integrated healthcare and start-to-finish journeys involving planes, trains and automobiles. We think of this as a "Curve 2" opportunity that creates "life experience" ecosystems. The companies on this curve will use blockchain to interact with their customers in new ways.

To compete and succeed in the emerging blockchain landscape, companies need to ride both curves (see Figure 1 below). In general, as described by Ian Morrison, former President of the Institute for the Future, innovation along Curve 1 represents improvements to the status quo to optimize processes and make an organization more competitive. Curve 2 represents innovation around new models.³ At some point, a Curve 2 model will emerge to become mainstream, itself beginning the optimization path as the next Curve 1 in a continuous back-and-forth between innovation and maturity. Investing in blockchain along both curves helps prepare organizations for the crossover when Curve 2 innovation surpasses Curve 1, becoming the new norm.

Blockchain can help companies become better at what they already do by reducing their costs and by reducing the sources of friction that can degrade the customer relationship.

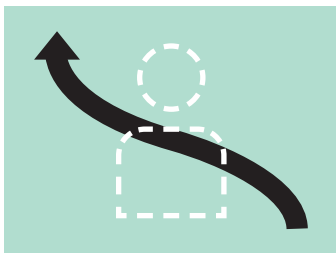
³ Institute for the Future, "Forecasts + Perspectives," accessed at <http://www.iftf.org/what-we-do/foresight-tools/forecasts-perspectives/>

Figure 1: Two Trajectories for Blockchain Development



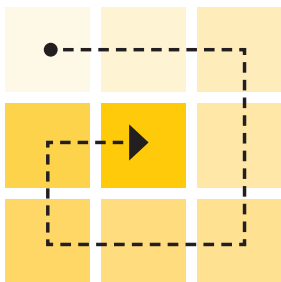
Companies should pursue blockchain on two concurrent tracks: Curve 1 focuses on implementing blockchain initiatives within existing business models. Work on Curve 2 engages other partners (including customers) in an ecosystem to address customers' life experiences.

Diagram adapted by TCS from IFTF/Ian Morrison framework

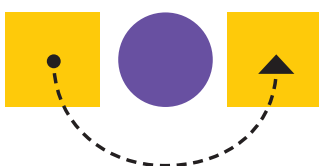


Blockchain Now (Curve 1): Remove Friction and Frustration from the Customer Experience

Blockchain technology represents a valuable opportunity for creating efficiencies in existing ecosystems because it cuts out the need for an expensive and inefficient layer of intermediaries. The technology employs three key concepts to achieve this:



- A **digital ledger** links authenticated records of transactions—known as blocks—in a way that is transparent, trustworthy and verifiable, encrypted and decentralized. This means that participants in the blockchain all see the same changes to the shared record of events at the same time. No third-party entity needs to update the ledger or validate it. The changes are secured through encryption, and every block that updates the blockchain is authenticated before it is added to the shared record. That embeds security in the chain.



- **Smart contracts** allow people to make transactions based on transparent, known, and unchangeable rules. As a result, there is no need for middlemen to get between a company and its customers. The cost-savings from eliminating non-value adding parties can be passed on to consumers through lower prices or better products and services.



- A **digital identity** for customers (known as the self-sovereign digital identity) allows customers to keep a single digital identity for all their accounts, eliminating the need for burdensome logins and passwords. It also reduces the risk of security breaches by eliminating the need for central servers that store personally identifiable information.

Among the sectors that are already capitalizing—or looking to capitalize—on blockchain to enhance the customer experience are travel and tourism, health care and the automobile industry.

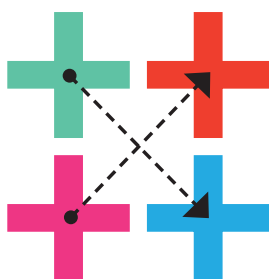


Travel Blockchain: More Efficient Traveler Security, Faster Bookings

In the travel industry, companies are experimenting with blockchain to improve the experience of tourists—everything from making security more efficient to faster bookings.

Shocard, for instance, is a startup that has developed a service for airlines that expedites the check-in process at airports and cuts the time customers spend in long queues. Passengers upload all their travel documents, which are registered on a blockchain. They are then given a single travel token that airlines can use to verify their identity quickly and securely.⁴

Another startup, Winding Tree, offers a decentralized travel distribution network. The Swiss company is working with six airlines and a hotel chain to create a shared booking platform with real-time information on holiday tour packages. The initiative is designed to circumvent the big distributors of travel services (which can charge package holiday providers commissions of up to 25%), thereby reducing the customer's costs.⁵



Health Care Blockchain: New Platform for Electronic Medical Records

In the health care industry, blockchain technology has enormous potential to make sharing medical records more efficient, secure and privacy compliant. A 2018 study found 14% of health care organizations expect to have a blockchain-based system in place by the end of the year, with 70% expecting to invest in implementations by 2020.⁶

⁴ Shocard website, accessed at: <https://shocard.com>.

⁵ Winding Tree, "A Practical Application of Blockchain for the Travel Industry," white paper, accessed at: https://windingtree.com/assets/files/White_Paper_EN.pdf.

⁶ BIS Research, "Global Blockchain in Healthcare Market to Reach \$5.61 billion by 2025," press release, April 19, 2018, accessed at <https://www.prnewswire.com/news-releases/global-blockchain-in-healthcare-market-to-reach-561-billion-by-2025-reports-bis-research-680230953.html>.

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Today, a patient's medical history rarely resides in a single place or file. Typically, electronic health records are held separately by hospitals, medical labs, clinicians and other healthcare institutions and professionals. The result: Patients and their doctors seldom have quick and easy access to a complete medical history, which can be critical to their care.

How can blockchain help? Every health record could be tagged with the patient's unique digital identity, encrypted, sent to cloud storage, and registered in the blockchain. To access these records, patients would use a private key and grant access to doctors and others who need to refer to their complete medical record. MedRec, based at the MIT Media Lab, is developing such a blockchain system.⁷

Insurers and health care providers also are experimenting with the technology. Nashville-based Change Healthcare, a network with 800,000 doctors, 117,000 dentists, and 60,000 pharmacies, has launched a blockchain to process insurance claims.⁸ And a group including Humana Inc., Optum and Quest Diagnostics is working on a blockchain directory of health-care providers to make listings more accurate and accessible.⁹

Blockchain's Future (Curve 2): When Companies Partner with Customers on End-to-End Experiences

While blockchain technology can be used to help companies make their current business better, its greatest potential lies in helping companies innovate and make their business different. In his comments on *The Blockchain Revolution*, Apple co-founder Steve Wozniak says, "We're at one of those times in technological, economic and social history where the sky is the limit."¹⁰ In the blockchain-enabled world, consumers can become active producers of the goods and services they use—so-called "prosumers." As such, they can partner with companies and other organizations in decentralized networks that transact and create value.

⁷ Wall Street Journal, "How Blockchain Could Help Lower Health Costs," May 28, 2018, accessed at: <https://www.wsj.com/articles/how-blockchain-could-help-lower-health-costs-1527559440>.

⁸ Wall Street Journal, "How Blockchain Could Help Lower Health Costs," May 28, 2018, accessed at: <https://www.wsj.com/articles/how-blockchain-could-help-lower-health-costs-1527559440>.

⁹ Wall Street Journal, "How Blockchain Could Help Lower Health Costs," May 28, 2018, accessed at: <https://www.wsj.com/articles/how-blockchain-could-help-lower-health-costs-1527559440>.

¹⁰ Steve Wozniak, reference to book *Blockchain Revolution*, by Don Tapscott and Alex Tapscott, Penguin Random House, accessed at: <https://www.penguin.co.uk/books/288418/blockchain-revolution/>.

Instead of offering customers just one or two parts of an overall desired “life experience,” companies could collaborate with them on shared platforms enabled by blockchain technology. For example, the birthday party business is a huge, recurring revenue generator around the world. Today, customers must cobble together the various products and services that go into creating a memorable celebration: the venue, the invitations, the food and drink, the entertainment, the party decorations, the transport to and from the venue, and so on. But in a blockchain-enabled world, it is possible to imagine that the different providers of the products and services for a birthday party could come together and, with the customer, design a bundled one-stop service that takes the stress out of the day, leaving the pleasure.



New Partners: Indigenous Peoples and the Tourists Who Visit Them

Already, one can find pioneering experimentation with blockchain in the travel and tourism industry. IDGO is a collaborative partnership working to ensure that the world’s 370 million indigenous peoples can reap the rewards of visitors to their communities and lands (as opposed to the current situation where they rarely enjoy the benefits of tourist revenue). IDGO’s planned blockchain-enabled services include:¹¹

- **A digital identity** for indigenous people and for tourists who visit them and their lands. Tourists would pay a fee to receive a special passport, with proceeds going to the local community to be reinvested in environmental protection, education and indigenous cultural activities.
- **A community token and associated “smart wallet.”** One of the key components of blockchain technology—alongside the ledger, the smart contract and the digital identity—is the special token or coin known as a “purpose-driven currency.” This provides a means of exchange between participants in the life experience ecosystem. With IDGO, the indigenous people can give tourists community tokens that can be used to pay for goods and services.

For instance, on Orchid Island, in Taiwan, the Tao people were largely unknown to the outside world before the 1960s. Ever since, they have seen a surge of tourists. Some 140,000 tourists now visit the island

¹¹ Medium, “Why the Blockchain is the Holy Grail of Indigenous Communities,” April 11, 2018, accessed at: <https://medium.com/idgo/why-the-blockchain-is-the-holy-grail-of-indigenous-communities-aa48893c3e97>.

every year, generating income for travel companies but generating 120 tons of trash per month for the local people to clean up. Facing threats to their culture and environment, the Tao people hope the new blockchain-enabled partnership will help them accommodate the tourists (and the revenue they bring) while restoring their island to its former pristine state. And, if successful, IDGO plans to extend the partnership in Australia, New Zealand, Canada and the United States: a \$4 billion travel and hospitality market involving 500,000 indigenous people and 10 million tourists.¹²

In our view, experiments like these are just the beginning. Many other industries can transform the way they operate and enhance the customer experience with blockchain technology.



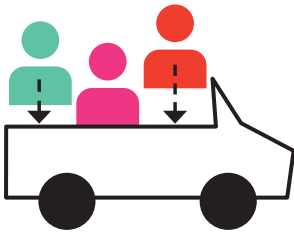
A Wellness Ecosystem for Health Care

Blockchain could help the healthcare industry transform its mission from treating sickness to improving health, the foundation for other life experiences. In the United States, 75% of healthcare expenditures go toward treating chronic problems: cardiovascular disease, cancer and diabetes. Given that all the industry's economic incentives reward procedural remedies (surgery and drugs), this is not surprising.

But there is another way—a blockchain-enabled wellness ecosystem—that could improve the health care system experience by facilitating collaboration and the efficient delivery of all healthcare services. Various stakeholders, collaborating through a blockchain-enabled network, could provide people with incentives to lead healthier lives.

Employers could give their employees reward tokens for exercising. Restaurants could provide customers with benefits for choosing healthy menu options. And insurers could compensate participating restaurants (since they benefit from individuals leading healthy lives). What's more, individual patients, as prosumers, could offer ideas for enhanced experiences based on their input and their participation levels in the varied offerings. Over time, such behavioral remedies could lead to a healthier population and reduce health care costs.

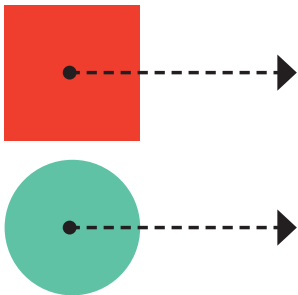
¹² IDGO website, accessed at <https://idgo.im>.



A Journey Ecosystem for the Auto Industry

The blockchain can transform the commuting experience, which would have major implications for the automotive industry. Around the world, cities are planning to protect the environment and improve their citizens' lives by banning cars. Hamburg, Germany, for example, plans to allow only pedestrians and bikers to enter certain areas.¹³ To counter this existential threat, automobile manufacturers could encourage car-sharing companies to join blockchain-enabled networks that promote intermodal transport.

One can imagine a journey ecosystem consisting of car-sharing companies, bike-sharing firms, office providers, restaurants, government agencies, shopping malls and housing communities. Together, the transport providers could create a single billing system, so customers could use a bike, car or train, and pay for all of them at one convenient location. At the same time, employers, government agencies and housing communities could use reward tokens to promote good transport habits, reducing congestion and pollution, and creating more engaged customers.



Action Plan: What Companies Need to Do Now

When deciding how to approach blockchain, it might seem tempting to focus first on optimizing the efficiencies of the existing business. But we recommend that companies conduct parallel programs that focus on both efficiency and life experience opportunities.

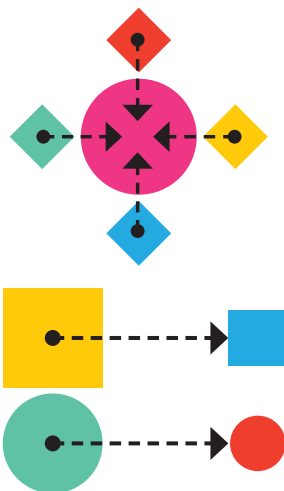
If companies delay experiments with life experience ecosystems, they risk disruption by networks of blockchain-connected competitors working collaboratively to create offerings that address a person's life holistically, rather than a focusing on a narrowly defined customer experience. Such life experiences will bring new levels of convenience and facilitate more meaningful ways for customers to interact with a company's offerings. This is an opportunity to pursue now, not later.

¹³ Business Insider, "13 cities that are starting to ban cars," June 1, 2018, accessed at: <http://www.businessinsider.com/cities-going-car-free-ban-2017-8#hamburg-is-making-it-easier-not-to-drive-4>.

Once senior executives have decided to launch a parallel program (efficiency and life experience), they should create two teams staffed with full-time, dedicated business and technical specialists. The team focused on efficiency should look for innovative ways that blockchain can help the current business become more customer-focused; for instance, by removing some of the day-to-day friction that frustrates them. It should look to partner with suppliers and other business collaborators.

The other team should focus on life experience ecosystems, looking for inventive ways blockchain can be used to create new businesses that engage with customers (and competitors) in novel ways. This team should include experts skilled in disciplines such as behavioral psychology, game theory and self-governing organizations. They need to be able to think beyond traditional industry relationships and include customers as contributors of business value.

Although the teams should be separate and focused on different opportunities, they should, nevertheless, follow the same five-step innovation process:

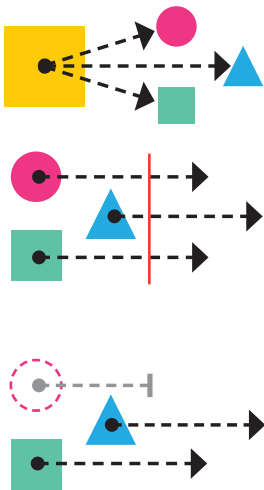


1. Strategic ideation.

Employ the efficiency team to analyze the company's current ecosystems, while the experience team analyzes all potentially relevant ecosystems. The teams should then map all the blockchain-enabled innovation opportunities for the different ecosystems.

2. Portfolio development.

Create a portfolio of blockchain-enabled opportunities: the efficiency team identifying the innovations that will sustain existing products and services, and the experience team identifying disruptive innovations that could create new products and services to meet the growing customer demand for differentiating experiences.



Companies should take great care to adopt an open, collaborative approach to blockchain ideation and implementation.

3. **Business case development.**

The teams draw up business cases for each of the opportunities.

4. **Prototyping and testing.**

The teams provide demonstrable proof of the value of these opportunities, creating and testing prototype products and services in an agile, lean development approach.

5. **Greenlight the best.**

Companies identify and implement the opportunities that are shown to have the greatest benefits for the company and its ecosystem partners.

An important final point to consider is this: Companies should take great care to adopt an open, collaborative approach to blockchain ideation and implementation. It is natural to think that the product of all this experimentation should be protected as valuable intellectual property. But companies that look to build walls around their inventions—as they have traditionally done—may struggle to succeed in the highly interdependent, interconnected blockchain era.

The people at the forefront of blockchain innovation, rekindling the spirit of the early days of the world wide web, are committed to working in open, collaborative ways. To attract this talent, companies need to embark on open, collective problem-solving initiatives.

Companies that erect walls around their innovation will be hard-pressed to match the speed of innovation possible with open source development with its transparent code base that can be tested, modified, and improved by people intrinsically motivated to do so.

Blockchain can help create an enduring relationship with newly engaged customers and position the company for a sustainable future in an age of disruption.

No Time to Lose

Blockchain is a new technology. It is not surprising that many senior executives are still exploring the full implications of what it means for them and their companies. But they cannot afford to take too long to get up to speed. Blockchain innovation is occurring so swiftly that companies may be disrupted if they do not act soon. Right now, the chances are that competitors, as well as new market entrants, are actively exploring potential blockchain-based innovations.

Accordingly, senior executives should make pursuing a two-pronged program of blockchain experimentation—seeking opportunities on both Curve 1 and Curve 2—to help their company compete more effectively (by generating greater efficiencies) and collaborate more productively (by joining innovative networks focused on creating value).

If done right, they can hope to create an enduring relationship with newly-engaged customers and position the company for a sustainable future in an age of disruption.

The authors wish to acknowledge the contributions of Subhajit Das to this article.

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